

Copper and Copper Alloy Tube, Pipe and Fittings

COPPER and COPPER ALLOY TUBE and PIPE

Seamless Copper Pipe:

Copper pipe is almost pure copper manufactured to the requirements of **ASTM B 42 - Standard Specification for Seamless Copper Pipe, Standard Sizes**. It may be manufactured from any of five (5) copper alloys (C10200, C10300, C10800, C12000, C12200) that all conform to the chemical composition requirements of alloys containing a minimum of 99.9% Copper (Cu) and a maximum of 0.04% Phosphorous (P). Available sizes are 1/8" to 12" diameters in regular wall thickness and 1/8" to 10" in extra strong wall thickness. The standard length for copper pipe is 12 feet.

Copper pipe is suitable for plumbing, boiler feed lines, refrigeration and for similar purposes.

Joints in seamless copper pipe can be threaded, flanged or brazed to fittings of the appropriate joint configuration.

Seamless Red Brass Pipe:

(Red) Brass pipe is an alloy of copper manufactured to the requirements of **ASTM B 43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes**. It is manufactured from alloy C23000 which is comprised of approximately 85% Copper (Cu) with no greater than 0.05% Lead (Pb) and 0.05% Iron (Fe) and the remainder Zinc (Zn). Available sizes are 1/8" to 12" diameters in both regular and extra strong wall thickness. The standard length for red brass pipe is 12 feet.

Brass pipe is moderately resistant to many corrosive solutions and is often utilized for water supply and distribution.

Joints in red brass pipe can be threaded, flanged or brazed to fittings of the appropriate joint configuration. Fittings in the smaller sizes, normally those below 2" diameter are, screwed cast copper alloy or brazed cup cast copper alloy. Fittings above 2" diameter are normally threaded, flanged, brazed or in some cases grooved mechanical joint fittings are employed.

Seamless Copper Tube, Bright Annealed:

Bright annealed copper tube is an almost pure copper tube manufactured to the requirements of **ASTM B 68 - Standard Specification for Seamless Copper Tube, Bright Annealed**. It may be manufactured from any one of the following alloys: C10200, C10300, C10800, C12000, or C12200 unless specified otherwise on the original contract or purchase order.

ASTM B68 tube is suitable for use in refrigeration, fuel oil, gasoline, or oil lines where the interior surface of the tube is essentially free of any scale or dirt and is specifically specified as ASTM B68.

This tube is provided in annealed tempers meeting O50 – Light annealed or O60 – Soft annealed in either straight lengths or coils.

It is the responsibility of the purchaser, when ordering to provide the requirements for alloy (UNS#), temper, dimensions (diameter and wall thickness), form (straight lengths or coils), and total length or number of pieces of any particular size. It is this requirement that forces this tube to be a special order tube and not a standard stocked material.

There is no specific requirements for identification of B68 tube and thus is not specifically designated as a tube permitted for use in most plumbing or mechanical codes. It is usually limited to use in specific manufacturing processes or production line type applications.

Seamless Copper Tube:

Seamless copper tube manufactured to the **ASTM B 75 - Standard Specification for Seamless Copper Tube** may be either round, square, or rectangular and is suitable for general engineering applications. It may be manufactured from any one of the following alloys: C10100, C10200, C10300, C10800, C12000, or C12200 unless specified otherwise on the original contract or purchase order.

Tubes meeting this standard may be furnished in any of several tempers (H55, H58, H80, O60, or O50) ranging from light drawn (usually limited to round tubes) to light annealed.

It is the responsibility of the purchaser, when ordering, to provide the requirements for alloy (UNS#), temper, dimensions (diameter, wall thickness, or distance between parallel surfaces), form (straight lengths or coils), and total length or number of pieces of any particular size. It is this requirement that forces this tube to be a special order tube and not a standard stocked material.

It is usually limited to use in specific manufacturing processes or production line type applications.

Seamless Copper Water Tube:

Copper water tube is a seamless, almost pure copper material manufactured to the requirements of **ASTM B 88 - Standard Specification for Seamless Copper Water Tube**, of three basic wall thickness dimensions designated as types K, L, and M. Type K is the thickest and type M is the thinnest with type L being of intermediate thickness. All three types of tube are manufactured from copper alloy C12200 having a chemical composition of a minimum of 99.9% Copper (Cu) and Silver (Ag) combined and a maximum allowable range of Phosphorous (P) of 0.015 % - 0.040 %.

Seamless copper water tube is manufactured in sizes 1/4" through 12" nominal. Types K and L are manufactured in drawn temper (hard) 1/4" through 12" and annealed temper (soft) coils 1/4" through 2" while type M is only manufactured in drawn (hard) temper 1/4" through 12".

Seamless copper water tube of drawn temper is required to be identified with a color stripe that contains the manufacturer's name or trademark, type of tube and nation of origin. This color

stripe is green for type K, blue for type L and red for type M. In addition to the color stripe the tube is incised with the type of tube and the manufacturer's name or trademark at intervals not in excess of 1½ ft. Annealed (soft) coils or annealed straight lengths are not required to be identified with a color stripe.

Seamless Brass Tube:

Seamless brass tube is manufactured to the requirements of **ASTM B 135 – Standard Specification for Seamless Brass Tube** and may be either round, square, or rectangular and is suitable for general engineering applications. It may be manufactured from any one of the following alloys: C22000, C23000, C26000, C27000, C27200, C27400, C28000, C33000, C33200, C37000, or C44300 and these alloys contain Copper (Cu) concentrations of between 60% and 90% with various percentages of Zinc (Zn), Lead (Pb), and Tin (Sn) permitted, depending on the alloy.

Tubes meeting this standard may be furnished in any of several tempers ranging from light drawn to light annealed.

It is the responsibility of the purchaser, when ordering to provide the requirements for alloy (UNS#), temper, dimensions (diameter and wall thickness, or distance between parallel surfaces), form (straight lengths or coils), and total length or number of pieces of any particular size.

Wrought Seamless Copper and Copper Alloy Tube:

ASTM B 251 – Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube covers a number of general requirements common to many wrought copper products. A few of these specifications are B 68, B75, B135, B466 and B743.

Products manufactured under the requirements of ASTM B251 may be of alloys of copper, brass or copper-nickel and may be produced in any number of tempers or shapes as specified by the purchaser.

Air Conditioning & Refrigeration Tube:

Copper tube used for air conditioning and refrigeration applications in the field (sometimes called "refer" or "ACR" tube) is an almost pure copper material meeting the requirements of **ASTM B 280 – Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service**. It is manufactured from copper alloy C12200 having a chemical composition of a minimum of 99.9% Copper (Cu) and Silver (Ag) combined and a maximum allowable range of Phosphorous (P) of 0.015 % - 0.040 %.

B 280 tube is produced in straight lengths or coils in tempers H58 or O60 respectively, although annealed straight lengths may be special ordered. Straight lengths are provided in sizes from 3/8" O.D. through 4 1/8" O.D. while annealed coils are supplied in sizes ranging from 1/8" O.D. through 1 5/8" O.D.

ACR tube is required to be identified in the following fashion:

Coils: The name or trademark of the manufacturer and ACR shall be permanently incised on each tube ¼" or larger at intervals not greater than 1½ ft.

Hard Straight Lengths: The name or trademark of the manufacturer and a mark indicating either L or ACR shall be incised at intervals not greater than 1½ ft. along the length of the tube. Hard straight lengths shall further be marked with a blue stripe containing

the manufacturer's name or trademark, the nation of origin, outside diameter and ACR repeating at intervals not greater than 3 ft.

Air conditioning and refrigeration tube (ASTM B 280) either coiled or straight length is further required to be cleaned and capped prior to shipping.

The maximum particulate residue limit for coils or straight lengths is 0.0035 g/ft² or as listed in Table 2 and Table 3 of the standard.

Threadless Copper Pipe (TP):

Threadless copper pipe, often referred to as TP pipe, is a seamless copper pipe material manufactured to the requirements of **ASTM B 302 – Standard Specification for Threadless Copper Pipe, Standard Sizes**. This pipe may be manufactured from either of two alloys, C10300 or C12200 with C12200 being the most popular. Both of these alloys are composed of copper (Cu) concentrations in excess of 99.9% thereby making this material an almost pure copper product.

Threadless copper pipe (TP) is manufactured in drawn temper (hard) only and is furnished in H58 temper in nominal or standard sizes ¼" through 12". The outside diameter of threadless copper pipe (TP) is essentially the same as schedule 40 pipe, although the wall thickness is much less than that for the same size pipe. The available lengths for threadless copper pipe is 20 foot for sizes ¼" to 10" with 12" being furnished in 15 foot lengths.

Threadless copper pipe (TP) is required, by the standard, to be identified by a gray colored stripe throughout its length that contains the manufacturers name or trademark, the nation of origin and "TP". It is further required to be incised at intervals not less than 1½ feet with the manufacturers name or trademark and "TP" throughout its entire length.

Threadless copper pipe (TP) is usually joined by brazed socket-cup type fittings or socket-cup type flanges. *It should be noted that standard copper pressure fittings of the B16.22 or B16.18 type are not compatible for use with TP pipe.*

Copper Drainage Tube:

Seamless copper tube used for sanitary drainage, waste and vent systems in plumbing applications is often referred to as "DWV" tube and is manufactured to the requirements of **ASTM B 306 – Standard Specification for Copper Drainage Tube (DWV)**. DWV tube is manufactured from alloy C12200 that is 99.9% copper (Cu) and has a phosphorous (P) content of between 0.015% to 0.040%.

DWV copper tube is furnished in H58 drawn (hard) temper only, in sizes 1¼" through 8". The standard length for DWV tube is 20 foot, however other lengths may be provided through prior agreement between the purchaser and the manufacturer.

DWV copper tube shall be identified in two manners. The first is by an incised mark, at intervals not greater than 1½ feet, containing the manufacturers name or trademark and "DWV". The second is by a continuous yellow stripe containing the manufacturer's name or trademark, the nation of origin and "DWV" to be repeated at intervals not greater than 3 feet.

Soldering of drainage pattern fittings meeting the ASME/ANSI B16.23 or B16.29 standards is the usual manner for joining DWV tube.

Welded Copper Tube:

This is a copper tube that is manufactured from either sheet or strip and has a longitudinal seam that is free of any type of filler metal and is usually manufactured to the requirements of **ASTM B 447 – Standard Specification for Welded Copper Tube**.

Welded copper tube may be manufactured from any of the following alloys of copper: C10100, C10200, C10300, C10800, C11000, C12000, C12200, or C14200. Unless it is specifically specified in the contract for manufacturer any of the listed alloys shall be considered acceptable; however welded copper tube manufactured from alloy C11000 may not be used in applications where hydrogen embrittlement may occur.

Welded copper tube may be furnished in the annealed (soft), O60, O50 or drawn (hard) temper in sizes and lengths specified by the purchaser.

Essentially this tube is an engineered type tube where the purchaser must specify the type of copper alloy, the form of the tube (straight length or coil), temper, internal flash treatment, and dimensions (diameter, wall thickness, length).

Welded Brass Tube:

Welded brass tube may be provided in either round, rectangular or square form and is manufactured to the requirements of **ASTM B 587 – Standard Specification for Welded Brass Tube** for engineered applications.

Welded brass tube may be manufactured from any one of the following copper alloys: C21000, C22000, C23000, C26000, C26800, C27000, or C27200. the copper(Cu) content of these alloys ranges from 62.0% to 96.0% depending on the alloy chosen.

Essentially this tube is an engineered type tube where the purchaser must specify the type of copper alloy, the form of the tube (straight length or coil), dimensions, (distances between parallel surfaces if square or rectangular, inside and outside diameter if round), wall thickness, overall length, and temper.

Medical Gas Tube:

Seamless copper tube used for the installation of non-flammable medical gases (and in some cases high-purity applications) where the gases being delivered are not considered flammable is manufactured to the requirements of **ASTM B819 – Standard Specification for Seamless Copper Tube for Medical Gas Systems**.

Medical gas tube may be provided in one of two types, type K or type L, in drawn (hard) H58 temper only. (Both of these types are defined and described in ASTM B88.) Alloy C12200 is the only alloy permitted for use for medical gas tube and is a minimum 99.9% pure copper (Cu) and silver (Ag) combined with no greater than 0.040% phosphorous (P).

Medical gas tube is required to be cleaned, by the manufacturer, so that the maximum interior surface residue does not exceed 0.0035 g/ft² of interior surface. Cleaning techniques may be found in CGA G4.1 although the manufacturer is not limited to those procedures or practices.

Medical gas tube is required, by the ASTM B 819 standard, to be identified with a continuous stripe of either green for type K or blue for type L containing the type of tube, the manufacturers name or trademark, the nation of origin at intervals not to exceed 3 feet. It is further required to be incised

with the type of tube, the manufacturers name or trademark at intervals not to exceed 1½ foot. Acceptable additional required markings in the color appropriate for type K (green) or type L (blue) shall be “OXY”, “MED”, “OXY/MED”, “OXY/ACR”, “ACR/MED”

Fuel Gas Tube:

Seamless copper tube for fuel gas installations of natural gas or liquefied petroleum (LP) can, in some jurisdictions, use tube manufactured to the requirements of **ASTM B 837 – Standard specification for Seamless copper Tube for Natural Gas and Liquefied Petroleum (LP) Gas Fuel Distribution Systems**. This tube is manufactured from alloy C12200 that is 99.9% copper (Cu)and silver (Ag) combined and has a phosphorous (P) content of between 0.015% to 0.040% making it an almost pure copper material.

(It should be noted that ASTM B837 copper tube is not permitted for use by NFPA 54 – National Fuel Gas Code as an acceptable copper tube material for fuel gas applications and adherence to applicable model, local, state and federal codes should be referred to prior to its use.)

This tube is furnished in annealed (soft) (O60) temper in sizes 3/8” O.D. through 7/8” O.D. and in drawn (hard) (H58) temper in sizes 3/8” O.D. through 1 1/8” O.D.. Coils may be provided in 60 or 100 foot lengths while straight lengths may be provided in 12 or 20 foot lengths. Longer lengths may be provided upon prior agreement between the manufacturer or supplier and the purchaser.

This tube is required to be permanently marked (incised) with the mark “Type GAS” and the name or trademark of the manufacturer at intervals not to exceed 18 inches. Additionally, drawn (hard) temper straight lengths of tube shall be identified by a yellow colored stripe containing the type of tube, name or trademark of the manufacturer or both, and the country of origin.

COPPER and COPPER ALLOY FITTINGS

Cast Bronze Threaded Fittings: Classes 125 and 250

Cast bronze threaded fittings in class 125 and class 250 shall be manufactured to the requirements of **ANSI/ASME B16.15 – Cast Bronze Threaded Fittings**.

These fittings shall be produced to meet the general requirements of ASTM B 62, Alloy C83600 or the chemical and tensile requirements of ASTM B 584, alloys C83800 or C84400. Other alloys permitted for use to manufacture fittings from bar stock in smaller sizes for wrought plugs, caps, couplings and bushings shall meet the requirements of Alloy C36000 (Free Cutting Brass Rod, Bar and Shapes) or C32000 or C31400 (Leaded Brass)

Essentially, the elemental make-up of these cast brass fittings is approximately but not exactly equal to 85% Copper (Cu), 5% Tin (Sn), 5% Lead (Pb) and 5% Zinc (Zn). *(Although other elements may be part of the Alloy structure more detailed analysis of the Alloys can be obtained from Copper Development Association Inc from their website at <http://piping.copper.org>)*

These fittings shall be threaded in accordance with the requirements of ANSI/ASME B1.20.1 general-purpose pipe threads and the threads shall be tapered. Wrought couplings, caps, and bushings in nominal pipe sizes of $\frac{1}{8}$ ", $\frac{1}{4}$ ", $\frac{3}{8}$ ", and $\frac{1}{2}$ " may have straight internal threads.

Class 125 fittings shall be identified with the manufacturer's name or trademark and Class 250 fittings shall be marked with the manufacturer's name or trademark and the numbers "250". The requirement for marking may be omitted from fittings that are deemed too small to provide adequate surface area for marking.

Cast Copper Solder Joint Fittings: Pressure Applications

Cast copper alloy fittings used in solder joint applications are to be manufactured to meet the requirements of **ANSI/ASME B16.18 – Cast Copper Alloy Solder Joint Pressure Fittings**.

These fittings shall be produced to meet the general requirements of ASTM B 62, Alloy C83600 or the chemical and tensile requirements of ASTM B 584, alloys C83800 or C84400.

Essentially, the elemental make-up of these cast brass fittings is approximately but not exactly equal to 85% Copper (Cu), 5% Tin (Sn), 5% Lead (Pb) and 5% Zinc (Zn). *(Although other elements may be part of the Alloy structure more detailed analysis of the Alloys can be obtained from Copper Development Association Inc from their website at <http://piping.copper.org>)*

These fittings (socket end diameter) are sized in accordance with the requirements of the ASTM B88 – Seamless Copper Water Tube (1/4" – 12" nominal diameters), while the sizes of any threaded connections (female or male) correspond to nominal pipe sizing.

Marking of these fittings shall be in accordance with MSS SP-25. They shall bear a permanent mark indicative of the manufacturer's name or trademark; although fittings in sizes less than $\frac{1}{2}$ " may have this requirement omitted.

The actual burst strength of the fitting shall not be less than the burst strength, as computed, for type L seamless copper water tube of annealed temper.

Wrought Copper Solder Joint Fittings: Pressure Applications

Wrought (Wrot) copper fittings used for pressure applications shall be manufactured to meet the requirements of **ANSI/ASME B16.22 – Wrought Copper and Copper Alloy Solder Joint Pressure Fittings**.

These fittings may be manufactured from any one of the following alloys: C10200, C12000, C12200, or C23000 or any copper alloy that contains at least 84% Copper (Cu) and a maximum of 16% Zinc (Zn). *(Although other elements may be part of the Alloy structure more detailed analysis of the Alloys can be obtained from Copper Development Association Inc from their website at <http://piping.copper.org>)*

These fittings (socket end diameter) are sized in accordance with the requirements of the ASTM B88 – Seamless Copper Water Tube (1/4" – 12" nominal diameters), while the sizes of any threaded connections (female or male) correspond to nominal pipe sizing and the requirements of ANSI/ASME B1.20.1.

These fittings shall have a burst pressure approximately equal to four (4) times the rated internal working pressure of type L seamless copper water tube in annealed temper.

Marking of these fittings shall be in accordance with MSS SP-25. They shall bear a permanent mark indicative of the manufacturer's name or trademark; however, marking may be omitted from any fitting if it could damage the soldering surfaces.

Cast Copper Solder Joint Drainage Fittings: Drain, Waste and Vent Applications

Cast copper alloy fittings used for drainage, waste, and vent applications with solder joints are manufactured to the requirements of **ANSI/ASME B16.23 – Cast Copper Alloy Solder Joint Drainage Fittings – DWV**.

These fittings shall be produced to meet the general requirements of ASTM B 62, Alloy C83600 or the chemical and tensile requirements of ASTM B 584, alloys C83800 or C84400.

Essentially, the elemental make-up of these cast brass fittings is approximately but not exactly equal to 85% Copper (Cu), 5% Tin (Sn), 5% Lead (Pb) and 5% Zinc (Zn). *(Although other elements may be part of the Alloy structure more detailed analysis of the Alloys can be obtained from Copper Development Association Inc from their website at <http://piping.copper.org>)*

These fittings (socket end diameter) are sized in accordance with the requirements of the ASTM B306 – Copper Drainage Tube (1¼" – 8" nominal), while the size of any threaded connections (female or male) correspond to nominal pipe sizing (slip-joints are excepted).

Drainage fittings are required to be identified (marked) with a permanent mark containing the manufacturer's name or trademark and "DWV". Vent fittings shall be identified with the words "VENT ONLY" and have the manufacturer's name or trademark permanently marked in accordance with MSS SP-25.

All 90° fittings shall be pitched so that a slope of 0.25 in./ft. (2.1%) is developed in horizontal tube as referenced along a horizontal plane.

Cast Copper Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500

Cast copper alloy flanges or flanged fittings shall be manufactured to the requirements of **ANSI/ASME B16.24 – Cast Copper Alloy Pipe Flanges, Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500**.

Cast copper alloy flanges may be manufactured from alloy C83600 a leaded red brass alloy, C922200 a leaded tin bronze alloy, or C95200 an aluminum bronze alloy. These alloys are about 85 – 86% copper (Cu) with other elements making the remainder. *(Although other elements may be part of the Alloy structure more detailed analysis of the Alloys can be obtained from Copper Development Association Inc from their website at <http://piping.copper.org>)*

Flanges and flanged fittings shall be identified with the manufacturer's name or trademark along with the ASTM specification number, the rating class for which the flange was designed (ie. 150, 300, etc.), and "B16" to indicate the flange conforms to the requirements of this standard. The nominal size shall be included, although it may be omitted from reducing flanges and reducing flanged fittings.

Cast copper alloy flanged fittings may be manufactured from alloy C83600 a leaded red brass alloy or C922200 a leaded tin bronze alloy.

Flanges and flanged fittings furnished to this standard have the same flange diameters and drilling templates (bolt hole arrangement and size) as prescribed in ASME/ANSI B16.1, B16.5, and B16.42.

Gasketing and bolting materials for use with cast copper flanges and flanged fittings shall be as prescribed in the applicable ANSI or ASME standards.

Flared Copper Fittings: Cold Water Service

Flared fittings for use with flared copper tube for cold water applications with a maximum water pressure of 175 psig are manufactured to the requirements of **ANSI/ASME B16.26 – Cast Copper Alloy Fittings for Flared Copper Tubes**.

These fittings shall be produced to meet the general requirements of ASTM B 62, Alloy C83600 or the chemical and tensile requirements of ASTM B 584, alloys C83800 or C84400.

Essentially, the elemental make-up of these cast brass fittings is approximately but not exactly equal to 85% Copper (Cu), 5% Tin (Sn), 5% Lead (Pb) and 5% Zinc (Zn). *(Although other elements may be part of the Alloy structure more detailed analysis of the Alloys can be obtained from Copper Development Association Inc from their website at <http://piping.copper.org>)*

These flared fittings are limited in size from 3/8" nominal to 2" nominal as designated by ASTM B88 for Seamless Copper Water Tube.

Marking of these fittings is limited to the manufacturer's name or trademark and that identification may be omitted from fittings less than 1/2" nominal size.

(These flared fittings are normally limited to use in underground water service lines and in some rare cases above ground water distribution piping and should not be mistaken for 45° flared fittings manufactured for higher pressure applications.)

NOTE:

As additional information for flared fittings for copper tube applications it should be understood that forged or machined brass flared fittings for pressure applications are manufactured to the dimensions and configurations of SAE standards.

The flare dimension and configuration for a 45° single flare is to be in accordance with the specifications of SAE J533

Wrought Copper Solder Joint Drainage Fittings: Drain, Waste and Vent Applications

Wrought (wrot) copper alloy fittings used for drainage, waste, and vent applications with solder joints are manufactured to the requirements of **ANSI/ASME B16.29 – Wrought copper And Wrought Copper Alloy Solder Joint Drainage Fittings – DWV**.

Fittings manufactured to this standard are to have a copper (Cu) content of not less than 84%.

These fittings (socket end diameter) are sized in accordance with the requirements of the ASTM B306 – Copper Drainage Tube while the size of any threaded connections (female or male) corresponds to nominal pipe sizing (slip-joints are excepted).

Drainage fittings are required to be identified (marked) with a permanent mark containing the manufacturer's name or trademark and "DWV".

All 90° fittings shall be pitched so that a slope of 0.25 in./ft. (2.1%) is developed in horizontal tube as referenced along a horizontal plane.

Wrought Copper Braze Joint Fittings

Fittings manufactured with "braze cup depth sockets" (short cups) shall be manufactured to the requirements of **ANSI/ASME B16.50 – Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings**.

These fittings may be manufactured from any one of the following alloys: C10200, C12000, C12200, or C23000 or any copper alloy that contains at least 84% Copper (Cu) and a maximum of 16% Zinc (Zn). *(Although other elements may be part of the Alloy structure more detailed analysis of the Alloys can be obtained from Copper Development Association Inc from their website at <http://piping.copper.org>)*

Braze fittings (socket end diameter) are sized in accordance with the requirements of the ASTM B88 – Seamless Copper Water Tube (1/4" – 8" nominal diameters), while the sizes of any threaded connections (female or male) correspond to nominal pipe sizing and the requirements of ANSI/ASME B1.20.1.

The maximum operating pressure (MOP) for fittings manufactured to this standard shall be essentially equal to the maximum system operating pressure listed for type L annealed seamless copper water tube. *It should be noted that maximum pressure-temperature ratings for any system is dependent upon many factors, including valves and other in-line appurtenances, and these other in-line items must be taken into account when determining the MOP of the entire system.)*

Fittings manufactured with "short cup depth" for brazing applications only shall be identified with the manufacturer's name or trademark and have the letters "BZ" in upper-case letters permanently marked on each fitting. Fittings smaller than 1/2" or fittings where such marking may damage the brazing surfaces may have the marking requirement omitted.

Copper and Copper Alloy Braze Fittings for TP Pipe Applications:

The following reference information is provided for information only and should not be misconstrued to be the final specification document for Copper and Copper Alloy Braze Fittings for "TP" of Pipe applications)

Fittings for use with copper and copper alloy threadless pipe ("TP"), or other copper alloy pipe types with O.D. dimensions equal to I.P.S. sizing are usually provided under standards other than ANSI or ASME. The most common reference standards are:

MIL F-1183 for fittings smaller than 6 in. diameter and with a pressure rating of 200 lbs. W.S.P. (water steam pressure)

MIL F-1183 for fittings over 6 in. diameter and with pressure Ratings of 150 lbs. W.S.P. (water steam pressure)

These fittings are manufactured from copper alloys meeting the requirements of ASTM B-61 or B-62 (C92200 or C83600 respectively). Many elements may be part of the Alloy structure and more detailed analysis of the Alloys can be obtained from Copper Development Association Inc or from their website at <http://piping.copper.org>)